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Makouta, to the north-east of that place; they are further to leave no effort untried to reach the Upper Congo river near Stanley Pool(about 4° S. lat. 17° E. long). It is contemplated to send a small steamer in sections for the navigation of the Upper Congo. San Salvador district is much more healthy than the coast, and the country is very productive. The people are described as very quiet.

MICROSCOPY.[1]

On a Standard for Micrometry.[2]—When the subject of a standard for micrometry came before this society at the suggestion of the late National Microscopical Congress, we found ourselves unable to vote satisfactorily upon it; not for want of any definite desire in respect to it, but because it seemed evident that a mere affirmative or negative answer to the proposals of the congress would not accomplish any desired result. For a few individuals or societies to commit themselves positively either for or against the proposals might even render valuable progress on this important subject more difficult. The differences of opinion were so strong and so reasonable, and the other interests involved were so diverse and wide spread, as to call for a thorough conference before adopting any definite policy. We therefore proposed a national committee to investigate the subject, confer with persons wishing to be heard or likely to give valuable information in respect to it, and place the data thus obtained at the service of all parties interested. As yet we have heard of no opposition to the appointment of the proposed committee. The whole spirit of the world's science at the present day calls for the highest possible precision in determining questions of the form and size of objects. It is well known that such precision has not yet been attained in micrometry; and it is difficult to believe that any one who desires to give a respectful hearing to the wishes of his fellow students, could seriously object to submitting this manifestly important subject to the consideration of a suitable committee. Whether in favor of one action, or of another, or of none, we should certainly be willing that all opinions and preferences be heard before making our final decision.

As to the course which should be adopted by the committee, or recommended to the country, there is, however, the greatest room for reasonable differences of opinion. And the same reasons which make a committee necessary, should require us to submit our views with candor and plainness, but without demanding or expecting that they shall be adopted as a whole. A fair hearing and a respectful consideration is all that can be asked by any one in such a case. And for the same reasons, any action taken by a committee or by any society or group of societies, should be suggestive or advisory and not positive or dictatorial.

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[1] This department is edited by Dr. R. H. Ward, Troy, N. Y.

[2] Remarks at the Microscopical Section of the Troy Scientific Association, December 2, 1878, by R. H. Ward, M.D.

There may even be some who believe that nothing useful can be accomplished in this field; but a second thought may show that much good can be effected, without doing anything of doubtful expediency. It seems unfortunate that in the suggestions of the congress more prominence was given to those points in regard to which there is greatest difference of opinion, and most intelligent doubt as to what ought to be done, than to the more important want underlying them. What we need is precision, first, and afterwards uniformity of nomenclature if we can get it. The essential part, on which all should agree, is that statements of size and distance should have a definite meaning; that when an author mentions, for instance, the 1–1000 of an inch, or the 1–100 of a centimetre or of a millimetre, that statement should mean one and the same thing to him, the writer, and to all intelligent readers. This certainly is not true in regard to the measurements made and recorded with the microscope in the past or at the present time. The best stage micrometers in use, as a basis for measurements, are well known to differ among themselves by various and easily measurable discrepancies which must represent errors on one side or both. In comparing micrometers from different sources, differences of two per cent. have been often noticed, and sometimes as high as six per cent. Far less errors than these, and as are quite generally present, must greatly impair the scientific value of all measurements; and it may be safely said that the exact degree of accuracy of the instruments used, and therefore of the measurements recorded, by observers with the microscope, is seldom known to the authors themselves, and scarcely ever to the readers of their papers. Nor can individual care and labor overcome this difficulty. A student can reject conspicuously bad rulings, and take the average of the best within reach; but cannot know, at last, exactly how well his best scale represents its nominal value. To determine how nearly the 1–100th of an inch on our glass plate corresponds to the 1–3600th of the standard yard in London or of our national copy of that standard in Washington, is a most valuable result which can be attained only by concerted action, and is well worthy the labor of any committee or of any society. We need a tangible inch, whether called a "standard" or not, which should be, as nearly as can be detected by the modern microscope, or by any other known means, the 1–36th part of the standard yard; or a centimetre corresponding equally well with the 1–100th of the standard metre; or some other equally determined unit, which should be officially recognized as authority for all who desire the greatest attainable accuracy. If so accurate a subdivision exists among the national standards at Washington, it might be verified by the committee, and arrangements sought from those having it in charge by which it could be made practically useful to the microscopists of the country. If such a standard does not exist, one should be made; or if it is not within the power of our present art to give results in which the microscope cannot find a fault, then the end could be attained, measurably well, by selecting a standard as perfect as possible, and attaching to it a statement of its carefully determined error.

This standard, if it be proper to call it a standard at all, should be selected by, or made for, the committee, should be the property of the nation, and should have no mercantile relations whatever. By means of a limited number of very carefully verified copies, which could also be used as a means of reconstruction in case of accidental destruction of the original, it could be rendered available to all persons who make or use micrometers. The cheapest commercial scales, even, could without increase of price be accompanied by a statement as to how closely the work of the screw which ruled them has been found to correspond with the standard; and all plates claiming a high degree of accuracy could be carefully compared, space for space, and accompanied by a statement of the ascertained error of each individual space. Persons of really scientific training would gladly incur the extra expense of such a corrected scale. Even a series of microscopical measurements already completed and published might, in some cases, receive additional value by a note, added in later editions, stating how nearly the apparatus used by the author has been found to correspond with the standard afterwards adopted.

Of course this standard would deserve the name only in a limited sense, and not in the same sense as the standard yard in London and the standard metre in Paris; but it would be an officially recognized representative of some unit practicable in microscopy, and it might be made to add greatly to the uniformity and value of our work.

The material of which the standard should be made, the form it should take, the manner in which the spaces should be indicated, the temperature at which it should be standard, and the manner in which it should be made available to the public, and in which its safety could be best secured, could only be determined after careful consideration of the world's recent experience in respect to the care and use of precise measures of length. It has even been debated whether the practical standard should be a ruled plate or a spacing screw for use in ruling plates. But as the work of a screw is known to vary considerably according to the conditions of its use, some of which conditions are not easily controlled, the adoption of a screw, however accurate it might be, would be likely to result in the dissemination of a number of ruled plates possessing equal authority as standards, but differing measurably from each other. Whether the micrometric standard should be taken from our national standard, at Washington, which is itself a copy, or from the world's standard in Europe, and whether coöperation with other countries is feasible in this work, are important questions for consideration.

Whether the standard secured should be a fraction of the yard or of the metre, and how large a fraction, I, for one, should scarcely have an opinion until the committee should ascertain how generally each system is used by the workers of the country, and how freely those workers would be willing to adopt the new system by general agreement. Whichever system is adopted, many microscopists would be glad to have a convenient unit in the other system, verified by comparison; a standard centimetre divided into one hundred parts, for instance, being accompanied by an inch similarly divided and having, microscopically, the same relation to it that it has mathematically. This method, of possessing a practical standard in each system while technically improper, would be a convenience, and would give a great improvement in our micrometry. Nor would the objection that it might hinder the universal adoption of the scientific (metric) system be a serious difficulty to my mind. The adoption and rejection of systems is a matter of evolution, not artifice, and the world will move at a rate that depends upon its average interests, without being much affected by special efforts to advance or retard its progress.

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SCIENTIFIC NEWS.

— The President nominated Clarence King for the directorship of the U. S. Geological Survey recently created by act of Congress, and the newspapers state that the Senate has confirmed the appointment. Of Mr. King's merits as a geologist we need not speak, as the Report of the Survey of the Fortieth parallel is an enduring monument to his ability. We shall hope that the fullest measure of success may attend the new Bureau and its distinguished director.

— It is with great regret that we learn that Frank A. Bradley, the well-known geologist, was recently crushed to death by the caving of the wall of a gold mine in Georgia. Mr. Bradley had at different times filled positions on the geological surveys of various States, including New York, Illinois, Tennessee and Georgia. He wrote many reports, and is the author of a geological map of the United States.

— Prof. George B. Wood, president of the American Philosophical Society, and formerly professor of the Institutes of Medicine in the University of Pennsylvania, recently deceased at the age of eighty-two years. He is well known as the author of Wood and Bache's Dispensatory, the standard work on the subject in this country. He left important legacies to the University